DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE
1325 East-West Highway
Silver Spring, Maryland 20910-3283

MEMORANDUM FOR: Distribution

FROM: W/OPS2 – Neal Dipasquale

SUBJECT: Operational Test and Evaluation (OT&E) Report for the Automated Surface Observing System (ASOS) Acquisition Control Unit (ACU) Version (V) 3.10 Software

Attached, for your information, is the Final Report for the V3.10 OT&E. This OT&E was a follow on to the OT&E for V3.08, which was completed in early March 2013. The ASOS ACU V3.10 Software OT&E Plan was coordinated through the NWS regional headquarters, FAA, U.S. Air Force (USAF), and U.S. Navy. The official plan and revised OT&E site list is posted at:

http://www.weather.gov/ops2/ops24/documents/asos_v3.htm

The 3.10 OT&E was conducted at 55 operational ASOS sites from May 6. 2013 – July 25, 2013 after successful completion of the V3.10 System Test (ST) and approval by the TRG. These sites were selected to validate the new software with a wide variety of communication configurations, hardware configurations, climatic regions, and represent each of the Government agencies supporting ASOS, in conjunction with ASOS ACU V3.10. Evaluation of ASOS performance at the OT&E sites was performed in accordance with the methodology presented in the OT&E plan. On September 25, 2013, the OT&E Test Director presented results from the 3.10 OT&E to the Test Review Group's (TRG) and to the ASOS Test Review Board (ATRB) for their recommendation for approval to deploy 3.10 at operational ASOS sites. The OT&E was successful, and the TRG and ATRB voted to approve 3.10 for national deployment at operational ASOS sites in the CONUS and Alaska. The ACCB approved 3.10 for National Deployment in early August 2013. There was an issue with ADAS-ASOS communications involving the CODEX modems at Pacific Region sites, which needs to be resolved before 3.10 can be installed at Pacific Region Sites. Efforts to solve this problem are ongoing between the FAA and the NWS in the Pacific Region. Once this problem has been solved, installation of 3.10 will begin at Pacific Region sites.

If you have any questions or comments, please contact the Test Director:
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OPERATIONAL TEST AND EVALUATION (OT&E) FINAL REPORT

For

Automated Surface Observing System (ASOS) Version 3.10

October 2013

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service/Office of Operational Systems
Field Systems Operations Center/Test and Evaluation Branch

Executive Summary

This test report contains the results from the Operational Test & Evaluation (OT&E) for the Automated Surface Observing System (ASOS) Version (V) 3.10 software. The report includes the test objectives and criteria, Test Trouble Reports (TTRs), test results, and recommendations.

The V3.10 OT&E started on May 15, 2013, and concluded on July 25, 2013. The V3.10 OT&E was conducted at 57 ASOS sites, representing a diverse set of ASOS hardware configurations, NWS regions, and FAA sites. Bi-weekly Test Review Group (TRG) meetings were held via teleconference with the TRG members during the OT&E, and the detailed minutes from each TRG meeting (and other information from the OT&E) were recorded and are available on the OPS24 website:

http://www.weather.gov/ops2/ops24/documents/asos_v3.htm

At the OT&E 'wrap up" meeting on July 25, the TRG voted to proceed with National Deployment of V3.10. The only "no" vote from the TRG was from the Pacific Region, because they have an ongoing ADAS-ASOS communication issues related to the settings in the CODEX modems that must be fixed before V3.10 can be deployed in the Pacific Region. The NWS and the FAA are working jointly to solve this problem. Once this problem is fixed, V3.10 will be deployed in the Pacific Region. More details on this issue and other work performed during the OT&E is contained in the body of this final report.

Also, on July 25, the ATRB voted unanimously to proceed with National Deployment of V3.10. The RC for V3.10 was approved and signed on August 12, 2013. Coordination for National Deployment of V3.10 will be conducted by the NWS Maintenance Branch (OPS12) and the NWS Observing Systems Branch (OPS22).

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Acronyms

ACU	Acquisition Control Unit
ACCB	ASOS Configuration Control Board
AOMC	ASOS Operations and Monitoring Center
APMC	ASOS Program Management Committee
ASOS	Automated Surface Observing System
ATRB	ASOS Test Review Board
CL31	Vaisala CL31 Replacement Ceilometer
CT12K	Current Vaisala 12K Ceilometer
DCP	Data Collection Platform
DoD	Department of Defense
DSM	Daily Summary Message
EPROMs	Erasable Programmable Read Only Memory
FAA	Federal Aviation Administration
IFW	Ice Free Wind Sensor
MCE	Meteorological Comparison Evaluation
Mod Notes	NWS Engineering Modification Notes
MSM	Monthly Summary Message
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OT&E	Operational Test and Evaluation
OOS	Office of Operational Systems
OPS24	Office of Operational Systems, Test & Evaluation Branch
OPS22	Office of Operational Systems, Observing Systems Branch
OST	Office of Science and Technology
OTR	Operational Trouble Report
PNS	Public Notification Statement
RC	Request for Change
SFSC	Sterling Field Support Center
TIN	Technical Implementation Notice
TRG	Test Review Group
TRR	Test Readiness Review
TS	Thunderstorm
TTR	Test Trouble Report
USAF	United States Air Force
WFO	Weather Forecast Office

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1.0 Introduction

This test report contains the results from Operational Test & Evaluation (OT&E) for the Version (V) 3.10 software on the Automated Surface Observing System (ASOS).

The OT&E started on May 15, 2013, and concluded on July 25, 2013. Weekly Test Review Group (TRG) meetings were held via teleconference with the TRG members during the OT&E, and the detailed minutes and other supporting documentation from each TRG meeting were recorded and are available on the OPS24 website:

http://www.weather.gov/ops2/ops24/documents/asos_v3.htm

V3.10 OT&E was a follow on OT&E to V3.08 OT&E which was completed in March 2013. V3.10 contains all the improvements and fixes contained in V3.08, plus critical fixes for TTR's that were written during V3.08 OT&E.

2.0 Purpose

The purpose of the OT&E was to confirm the many improvements and fixed Operational Trouble Reports (OTR's) that were implemented in V3.10 supporting ASOS software for operational use at ASOS locations under the auspices of the National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS), the Federal Aviation Administration (FAA), Department of Defense (DoD) U.S. Air Force (USAF), and DoD U.S. Navy.

3.0 OT&E Summary - ASOS Software V3.10

3.1 Test Objectives

The testing was completed and the results are valid for ASOS Software V3.10. All of the documents described in the following sections can be found at this link:
http://www.weather.gov/ops2/ops24/documents/asos_v3.htm
The OT&E test objectives were to validate:

A. Installation instructions for ACU software.

Evaluation Criterion: The NWS Engineering Modification Notes (Mod Notes) must be complete and accurate, providing all information required for successful installation. NWS Mod Note 80G will be used to install the ASOS ACU firmware. An overall "Satisfactory" rating must be obtained from the collection of completed on-line questionnaires for the questions pertaining to this test objective. OPS24 has received 4 responses from the field (via Survey Monkey). All responses to this question were either "Satisfactory" (2) or "Good" (1).
- **successfully completed.** Completed questionnaires and graphical displays from these questionnaires are presented in section 3.6 - Survey Monkey Results. Comments on installation instructions will be provided to OPS12.

B. ASOS ACU V3.10 firmware does not negatively affect ASOS operational systems.

Evaluation Criterion: All methods of ASOS communications are still functional, METARS/SPECIs continue to be transmitted correctly, OID interfaces for all screens and user levels are still functional, including the collection of SYSLOGS in case there is a problem. An overall "Satisfactory" rating must be obtained from the collection of completed on-line questionnaires for the questions pertaining to this test objective. All responses to this question

were either "Satisfactory (2) or "Good" (1). There was one ADAS-ASOS communication issue found at ITO – Hilo, HI, and the other Hawaii OT&E site LIH – Lihue. The ADAS-ASOS Communication (related to how the CODEX modem settings interact with V.10) issue at ITO is being tracked by the FAA, AOMC, and the Pacific Region. ITO is still running V3.10, but they are using the back-up mode of communications (telephone modem) to send ASOS Observations to AWIPS until the communication issue is solved. LIH has reverted back to V2.79Y until the communications issue is solved.

- **Successfully demonstrated -** completed questionnaires from Survey Monkey, and any other comments from the field sites are presented in section 3.6, and will be provided to OPS12.

C. New security upgrades: 5 new security Requests for Change (RC) function as designed. See the ASOS Software Release Note (**05/07/13 – V3.10 Release Notes**) for more detail (link in section 3.1).

Evaluation Criterion: Upon installation of V3.10 firmware at each site, the sites will use the current passwords (**must be entered in CAPS once V3.10 is installed)** for 60 days. Just prior to 60 days, OPS12 will dial into each OT&E site using a script file and change the passwords for the system manager (SYS), technician (TEC), remote access (RAC), and critical regional password (CRIT- for station elevation changes when required) to the 1st new 12 character password from the password table for each region. OPS12 will continue this process every 60 days from that point on. The Standard Operating Procedure (SOP) "Operating Procedures for ASOS Password Management" is available by clicking on the Miscellaneous Documents drop down menu from the link and selecting the file: **3/01/12 - Operating Procedures ASOS Password Mgmt v3.05**

The new passwords will be taken from an encrypted password table provided by SFSC. The 5 new security upgrades will need at least two sixty day cycles to test password expiration. Near the end of the first 60 day cycle, verify that OPS12 can dial into OT&E site and change the passwords for the four user groups (TEC, SYS, RAC and CRIT). This will occur prior to the 60 day expiration for the passwords and at approximately 50-60 day intervals after that. Validate the audit log (AUDLOG) contains correct information about password changes. See section 3.2.7 for more details.

- **Successfully demonstrated -** All V3.10 OT&E sites have successfully changed to the new 12 character passwords during the OT&E. More details on the 5 new security upgrades can be found in section 3.2.7.

D. ASOS ACU V3.10 firmware interface properly with all systems interfaced to ASOS.

Evaluation Criterion: The ASOS software under test must interface properly with all communication configurations including dial-up, GTA, ADAS/FTI, WSP, ATIS, RVR, and AWIPS/AFOS.

- **Successfully demonstrated –** The only issue found during the OT&E was with the ADAS-ASOS communications (related to the CODEX modem settings) in the Pacific Region. This issue only occurred in the Pacific Region. The NWS and the FAA are working jointly to solve this problem. Once this problem is fixed, V3.10 will be deployed in the Pacific Region.

E. Meteorological Requirement: Ice Free Wind (IFW) Sensor Quality Control (QC) Algorithm

Evaluation Criterion: NWS staff at WSH will analyze cases or events when the IFW Sensor QC Algorithm is "tripped" due to birds or other objects that pass through the sensors sample volume and contaminate the data.

- **Successfully validated** see section 3.2.1 for more details

F. Meteorological Requirement: Validation of Precipitation Accumulation.

Evaluation Criterion: NWS staff at WSH will analyze cases or events when conditions are right for potential false

precipitation accumulation from the AWPAG or Tipping Bucket.

- **Successfully validated** - see section 3.2.2 for more details

G. Meteorological Requirement: Change Thunderstorm Reporting Threshold for Specials

Evaluation Criterion: NWS staff at WSH analyzed cases of thunderstorms from sites with the ALDARS network to make sure SPECI's are generated when the thunderstorm changes from in the vicinity ("VCTS") to activity at the site ("TS") and when the thunderstorm changes from activity at the site ("TS") to in the vicinity ("VCTS"). Chosen sites where the observer edits TS and VCTS will also be evaluated.

- **Successfully validated** see section 3.2.3 for more details.

H. Meteorological Requirement: Sky Condition Algorithm in IFR Conditions.

Evaluation Criterion: NWS staff at WSH will analyze cases of sky condition from the OT&E sites during Instrument Flight Rule (IFR) (ceiling <1000FT) conditions to verify that the sky condition algorithm is working properly.

- **Successfully validated** see section 3.2.4 for more details

I. Evaluation of New Capabilities.

- **Successfully validated** see section 3.2.5 and 3.2.6 for more details on OTR and new capabilities in v3.10.

J. Evaluation of Reverting Back to Previous Software Version.

Evaluation Criterion: During the OT&E, one OT&E site was to be chosen at random to revert back to the previous load of ASOS software (V2.79Y) to verify that the older version V2.79Y can be loaded and that the AOMC can download the correct passwords from the previous version of software.

- **Successfully validated** – One OT&E site reverted back to V2.79Y during the OT&E: LIH –Lihue, HI, due to the ADAS-ASOS communication (related to settings in the CODEX modems) issue in Hawaii.

3.2 Summary of Data Analysis

OT&E Test Plan

Since the start of the V3.10 OT&E in mid May 2013, OPS24 and OPS22 have performed extensive data analysis on the new meteorological requirements (new or modified algorithms) that are part of V3.10. These new meteorological algorithms were outlined in the OT&E Test Plan which is available on the OPS24 website (link in section 3.1) by clicking on the Plans and Reports pull down menu from the link referenced in section 3.1 and selecting the file name **ASOS_V3.10_OT&E_Plan_Final** and **Addendum_v3.10_to_v3.07_OT&E_plan**.

Release Notes

More information about the meteorological algorithm improvements, 58 new capabilities, and 24 OTR fixes can be found in the Release Notes by clicking on the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and selecting the file name: **05/07/13 – V3.10 Release Notes.**

OPS24 has completed data analysis on many of the 58 new capabilities and 24 OTR fixes in the software. Some of the new capabilities could not be verified during 3.07 OT&E, but they were validated extensively during V3.10 OT&E. ST results for 3.07/3.10 are available to anyone who wishes to view the ST final report by clicking on the

Plans and Reports pull down menu from the link referenced in section 3.1 and selecting the file name **ASOS_ACU_V3.07-09_System_Test_Report_Final**
ASOS_ACU_V3.10_System_Test_Check_List_Completed.

The following sections (3.2.1 - 3.2.8) summarize the data analysis for the four new meteorological algorithms, and many of the improvements and OTR fixes in the software.

3.2.1 Meteorological Requirement: Ice Free Wind (IFW) Sensor Quality Control (QC) Algorithm

The WSH staff goal was to analyze 5-10 cases of wind data from those sites that experience high bird activity (or other types of obstructions in the path of the IFW sensor such as snow blocking the sensor paths during a blizzard) to validate and confirm the IFW Sensor QC Algorithm is functioning properly. The data collection effort for V3.10 OT&E yielded more than **55,500,000 five second wind data samples representing over 77,100 hours.** There were 24 ASOS sites analyzed during OT&E.
383,086 5 second wind samples were rejected (bracketed [ ] as questionable) at V3.10 OT&E sites. **97% of the rejected wind data was confirmed as "bad data" in the analysis.** Results show that for the 24 sites analyzed during the OT&E, only 0.33% of "good wind data" was rejected, which is roughly double with what was found during Developmental Test and Evaluation (DT&E) (0.17%). However, this is still the order of magnitude of what was expected.

More detailed information about the IFW QC algorithm can be found in the summary written by OPS22 by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:
OTE_IFWQC_V3 IFWS_QC_Algorithm_at_work, QC_alg_summary, and IFWS QC Algorithm data (Juneau AK)

The summary of rejected 5 second samples is available by clicking on the Miscellaneous Documents pull down menu and selecting the file names:
Results_IFW5SEC_Rejected_Samples_OUT_Count

In addition, more detailed information on the IFW QC algorithm can be found in the Release Notes (see section 3.2 for the link to this document). OPS22 and OPS24 will provide a Powerpoint presentation on the IFWQC Algorithm to the NWS and Navy.

3.2.2 Meteorological Requirement: Validation of Precipitation Accumulation

The goal of the staff at WSH was to analyze 5-10 cases to validate the Validation of Precipitation Accumulation Algorithm. This algorithm is also known as the "false tip" algorithm. The WSH staff looked for conditions that might cause a false accumulation in precipitation to occur. If these conditions existed, the WSH staff then analyzed the 12 hour archive from the sites that had a potential to report False Precipitation Accumulation, to see if the False Precipitation in the 12 hour archive was bracketed (i.e. [0.01]), and that bracketed data did NOT get added to any precipitation accumulation values; hourly precipitation (Prrrr), 3 hourly, 6 hourly (6rrrr), daily total precipitation (7rrrr), Daily summary total precipitation, Monthly Summary total precipitation, Daily Summary Message (DSM), or Monthly Summary Message (MSM).
During the V3.10 OT&E there were 45,445 [ ] bracketed values [0.00] or higher, and **282 minutes of [0.01] or greater**. **All 282 minutes of [0.01] or higher were NOT included in the updated precipitation values for the OT&E sites.** Data is available by clicking on the Miscellaneous Documents pull down menu and selecting the file names:
Results_False_Tips_Out_Count

3.2.3 Meteorological Requirement: Change Thunderstorm Reporting Threshold for Specials

The goal of the staff at WSH was to analyze 5-10 cases to validate the Change to Thunderstorm Reporting. The WSH staff, in conjunction with OT&E sites that are connected to the FAA's ALDARS system, analyzed SPECI Observations during thunderstorms to make sure that SPECI's were generated when a thunderstorm (TS) began or ended at a site (within 5NM), or a thunderstorm in the vicinity (VCTS) began or ended (6NM to 10NM) at a site, or the thunderstorm changed from VCTS to TS and vice versa.
3988 cases of VCTS and TS SPECI's have been obtained from the download of the METAR/SPECI's at the V3.10 OT&E sites. Files with examples of these METAR/SPECI's are available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:
Results_TS_VCTS_OUT_Count

3.2.4 Sky Condition Algorithm in IFR Conditions

The goal of the staff at WSH was to analyze 5-10 cases of sky condition from the OT&E sites in Instrument Flight Rule (IFR) conditions (ceilings < 1000FT) to validate the sky condition algorithm. WSH staff obtained **9371** METAR observations with cloud cover in IFR conditions at V3.10 OT&E sites.
.
Analysis indicates that the sky condition algorithm is performing as designed in IFR conditions. The data from and V3.10 sites is available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:
Results_SKY_OUT_Count

3.2.5 Evaluation of New Capabilities

The following new capabilities (improvements) in V3.10 were validated during the OT&E:

3.2.5.1 Transmit Specials at Anytime

Allows for SPECI's to be generated during the METAR edit time. **1791** SPECI's were transmitted during METAR's at the V3.10 OT&E sites. The file with examples of these SPECI's are available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named: **Results_SPECI_During_METAR_OUT_Count**

3.2.5.2 Include Temp/Dew Remark in All OBS

The "T-group" will now be included in all Observations (METARS and SPECIS). During the V3.10 OT&E there were **18,353** METAR or SPECI observations that showed the T-group. The file with this data is available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:
Results_SPECI_with_Txxxxxx_OUT_Count

3.2.5.3 Remove Additive Data from Specials and METARs transmitted during METAR Edit Period

Only the hourly precipitation remark (Pxxxx group only - not the 3 hour 3xxxx group, or 6 hour 6xxxx group) will be included in SPECI's transmitted during the Hourly (METAR) edit times. **802** SPECI's were transmitted during the METAR edit time at the V3.10 OT&E sites. The files with examples of these SPECI's are available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:

Results_SPECI_With_Pxxxx_during_METAR_OUT

3.2.5.4 Change Order of Encoded Remarks for Beginning/Ending Times of Thunderstorms

The thunderstorm begin/end times will now be encoded after the precipitation remark to comply with FMH-1. In summary, **3,988 METAR/SPECI's** show from the combined OT&E that the Beginning/Ending times for thunderstorms were encoded after the precipitation remarks, and are available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:
Results_TS_VCTS_OUT_Count

3.2.5.5 Report Multiple FEW Layers in Sky Field

There were **2,918** METAR's/SPECI's at V3.10 OT&E sites that contained multiple FEW layers from mid May 15, 2013-July 25, 2013. These METAR's/SPECI's are available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:
Results_FEW_OUT_Count

3.2.5.6 Generate Specials for Begin/End Ice Pellets

SPECI's will be generated when an Observer edits Ice Pellets (Begin/End and change of intensity). During the V3.10 OT&E there were **21** METAR/SPECI's with –PL edited into the present weather field by the OBS. The system correctly generated SPECI's for the Begin/End of ice pellets (-PL) These METER's/SPECI's are available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:
Results_PL_OUT_Count.

3.2.5.7 Auto Enable/Disable of Freezing Rain Sensor

This new feature was verified during the OT&E by the OT&E sites with a freezing rain sensor using Maintenance Note 39A (found at https://www.ops1.nws.noaa.gov/Secure/asos/Maints.htm).

3.2.5.8 Expand Operational Periods for the Freezing Rain Sensor

This improvement expands the date/time periods for turning ON/OFF the freezing rain sensor from six to nine periods. This was verified at the OT&E sites during the OT&E in connection with the Auto Enable/Disable Freezing Rain Sensor improvement using Maintenance Note 39A.

3.2.5.9 Move Pressure Sensors to the Bottom of the Page on the REVUE-SENSR-STAT page

To avoid accidental turning off of the pressure sensors, the pressure sensor prompts have been moved to the bottom of the REVUE-SENSR-STAT page. This was confirmed by OPS24 by dialing into several OT&E sites, and was verified at ST0 and SP1.

3.2.5.10 Separate Report Processing for Each Sensor

This new feature allows the TEC to turn ON/OFF report processing for sensors with multiple sensors (Ceilometer and Visibility). This was verified at ST0 and SP1 during the OT&E.

3.2.6 A Selected Set of OTR Fixes

- OTR 1002 – Edit Log Contains Date Time without any Log Entry – Downloading the EDIT LOG using Direct Command Mode (DCM) contained date entries without any description of the edit. OPS24 analyzed all available EDITLOGs from early May 15, 2013 – July 25, 2013 and found no occurrences of an Edit Log entry without a Date Time.

- OTR 1004 – Peak Wind Remark Not Encoded during transmission of Observation – Peak Wind should be encoded in METAR observations. This has been verified during **V3.10** OT&E, and **2,725** observations had peak wind remarks during the V3.10 OT&E. The results are available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:

  Results_PEAK_WIND_in_OBS

3.2.7 Validation of Five New Security Features for Password Management

Improve Access Security and Password Management - Passwords are checked to adhere to DOC requirements. Passwords will be encrypted before storage and transmission. Passwords will expire in 60 days from the time of creation but expired passwords will continue to be accepted by the system. A warning message will be displayed on the OID screen and generated in the SYSLOG 14 days before the password is to expire.
– Successfully Validated

Provide a Security Warning Message to Those Accessing ASOS Remotely –
– Successfully Validated

Audit Logs and Reports - Provide a Warning Banner to those accessing ASOS remotely prior to the prompt for the remote access code.
– Successfully Validated

Additional Security for Elevation Changes -–Before any change can be made to any elevation parameter in the ASOS site's database via remote access, an additional password must be entered. Such a change will be recorded automatically by ASOS in an event log.
- Successfully Validated. AUDLOGS are available upon request.

Unsuccessful Login Attempts – A new Audit Log is provided. When a defined event is detected, an entry to the Audit Log will be generated. When anyone dials in to ASOS remotely and doesn't enter any response it will be counted as an attempt to deny service. ASOS will check the number of attempts to deny service at 5:00 AM LST. If there are five or more attempts then a message will be logged in the Audit Log

– Successfully Validated – AUDLOGS are available upon request. The Password Security flowchart can be found by clicking on the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and selecting the file:

3/28/12 - V3.06 Password Security Flowchart

3.2.8 Analysis of Warm Starts During V3.10 OT&E

Warm Starts at OT&E sites have been tracked continuously since the beginning of the 3.05 in 2011, and were tracked during V3.10 OT&E. One major cause of warm starts was FTI induced warm starts. These

warm starts were dramatically reduced with **RC – 12510-** ***Reduce Warm Starts by FTI Comms*** (TTR 207) - incorporated in V3.10 – This RC dramatically reduced the number of warm starts induced by FTI communication problems, but it did not eliminate those types of warm starts.

Even though the FTI induced warm starts still occur the number of these warm starts was dramatically reduced, on average on the order of 85% less warm starts, and as much as 95% at FTI sites such as BMQ.

During V3.10 OT&E there were **210** warm starts at all 27 sites for the entire OT&E. Many of these warm starts occurred at sites with FTI induced warm starts as such UZA – Rock Hill, SC (**229 V2.79Y 52 V3.10)**, BMQ – Burnet, TX (**536 V2.79Y 3 V3.10**), and IGX – Chapel Hill, NC (**481 V2.79Y 6 V3.10**). This is a very positive trend. The FAA (Chris Archer) has independently confirmed that the warm starts have been dramatically reduced with V3.10.

The results are available by selecting the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and clicking on the file named:

Results_WARM_START_OUT_Count

A spreadsheet from the FAA which compares the warm starts at the OT&E sites before and after V3.10 was installed can be found by clicking on the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and selecting the file:

ASOS_Mod_Sites_Warmstart_count

3.3 Analysis of CL31 Sensor Response Timeout Errors

During the CL31 OT&E (V2.79V/X/Y), OT&E sites saw increased occurrences of CL31 Sensor Response Timeouts caused by increased sensor response string (larger) for the CL31. The CL31 sensor response timeouts were significantly reduced with the implementation of RC - 13221 - CL31 Sensor Response Timeout and the Setting of the Maintenance Flag in V3.10. OPS24 monitored the number of CL31 Sensor Response Timeouts during the V3.10 OT&E. There were no CL31 Sensor Response Timeouts observed during V3.10 OT&E.

3.4 Test Trouble Reports

The following Test Trouble Reports (TTR's) were generated during V3.08 OT&E, and fixed for V3.10 OT&E:

- **TTR 325 – Recurring DCP1 SIO Transmission Errors for Backup CL31 (L3) –**
  This TTR was determined to be CRITICAL by the TRG.

- **TTR 326 – Problems with Automated Freezing Drizzle -**

  This TTR was determined to be CRITICAL by the TRG

- **TTR 327 - Invalid Peak Wind Remark in METAR from TRI -**

  This TTR was determined to be not critical by the TRG.

3.5 Lessons Learned

During the V3.10 OT&E (and OT&E 3.06, 3061, 3.07, 3.08) there were several "lessons learned" that are summarized here:

Passwords: The "List of Authorized Users" in each region must be coordinated through the regional NWS focal points, and if an employee leaves the NWS or joins the NWS, the table of "authorized users" for that region must be updated. This table must be kept as up to date as possible by the NWS regional focal point, and when the NWS regional focal point is not available, they must designate a temporary focal point for password issues. This table of authorized users must be sent to SFSC and AOMC as soon as an employee leaves or joins the NWS.

Passwords: Once the passwords are changed from the current 8 character passwords to the new 12 character strong passwords, all users; NWS Focal Points, WFO focal points, and EL TECHs MUST follow the process outlined in the "Flowchart for a Misplaced Password" that is available on the OPS24 website or follow the process for retrieving a lost password that is outlined in the SOP by clicking on the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and selecting one of these two files:
3/28/12 - V3.06 Password Security Flowchart or 3/01/12 - Operating Procedures ASOS Password Mgmt v3.05

- Passwords: All Users (SYS, TEC, etc.) MUST remember their old/existing 8 Character passwords BEFORE they switch to the new 12 character passwords. After cold boot; for sites with V2.79Y; the user must first log on as a TEC with the default password (entered in CAPS) for the site. Once the ASOS site had dialed into the AOMC and downloaded the EXISTING 8 character passwords**, the user must know what these passwords are**. If they forget the old 8 character password that is stored in AOMC, it will require calls to AOMC to get the password.

- Passwords: Passwords at sites that upgrade from V2.79Y to V3.10 will be changed according to the EXISTING scheduled date of change (from OPS12) for the 12 character passwords for that particular region. For example: if a site V3.10 55 days prior to the next scheduled 12 character passwords for their region, they will wait 55 days until their passwords are changed to the next set of regional 12 character passwords. If the site installs V3.10 1 day prior to the next regularly scheduled change for 12 character passwords, they will wait 1 day to change passwords to the new 12 character passwords.

- Users MUST follow instructions in Mod Note 80G, Maintenance Note 86, and Maintenance Note 39A (found at https://www.ops1.nws.noaa.gov/Secure/asos/Maints.htm) when installing V3.10. It is very important to read all of the documentation that is being provided to ensure a smooth transition to the new software load. A thorough review of these documents is needed to avoid many of the problems that were encountered during Phase 1 of the OT&E.

- The ASOS Technical Manual Chapter 6.2 will take the place of Maintenance Note86 and 39A for the deployment of the Freezing Rain Sensor.

- TEC must Cold Boot ASOS prior to installing V3.10, and; at sites with a DCP(s), pull the jumper at the DCP to completely clear the memory prior to installing V3.10. If this step is not taken, the results are unpredictable and the software will not be stable.

Train users: TEC, SYS on new features of V3.10 including:

  - **Turn the Ice Accretion Remark to "ON" on the REVUE-SITE-PHYS page;** perhaps on the date when the region automatically turns on the freezing rain sensor. Only the SYS can perform this change.
  - TEC must set the "Cal Authorized?" to "Y" when the automated remark "Cal Needed? Y" is generated by the ASOS software on the FZRA sensor page. The TEC should consult Chapter 6.2 of the ASOS Technical Manual for details.

Make sure that sites designated as AO1 (not required to have a present weather sensor; LEDWI) change (toggle) their site from AO2 to AO1 on REVUE-SITE-PHYS-PAGE. This will assure that the Validation of Precipitation Algorithm does not run- at AO1 sites.

- The most important thing that users can do to minimize issues is to review the documentation. Users should review the Release Notes, ASOS Security SOP; and other related documents that are available on the OPS24 website; to become familiar with the many changes in V3.10.

TRAINING – Each NWS Region Focal Points and the local WFO associated with each OT&E site should train the meteorologists/forecasters on the meteorological changes in V3.10, using the Release Notes, which are found by clicking on the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and selecting the file name **05/07/13 - V3.10 Release Notes**.

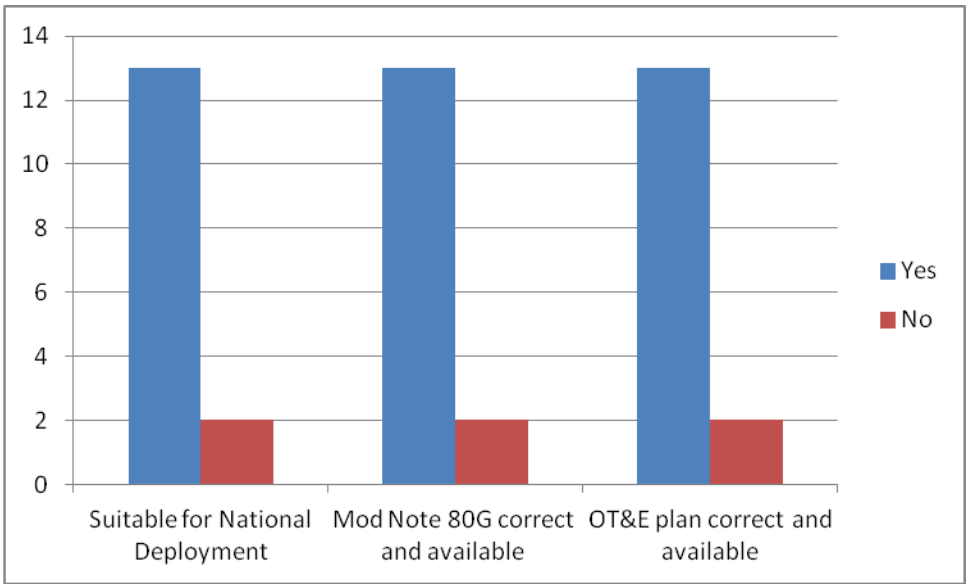
OPS22 and OPS24 provided a Powerpoint briefing to the NWS Regions (on September 26, 2013) on the IFWQC algorithm (link in section 3.1 under Plans and Reports pull down menu) , and will provide the same presentation to the Navy at a later date.

OPS24 and OPS12 cannot stress enough that ET's and users/players need to read the documentation provided during the OT&E, and to be provided for installation of V3.10: Mod Note 80G and Chapter 6.2 (Freezing Rain Sensor) of the ASOS Site Technical Manual (link provided by OPS12) before installing V3.10.

3.6 Survey Monkey Results

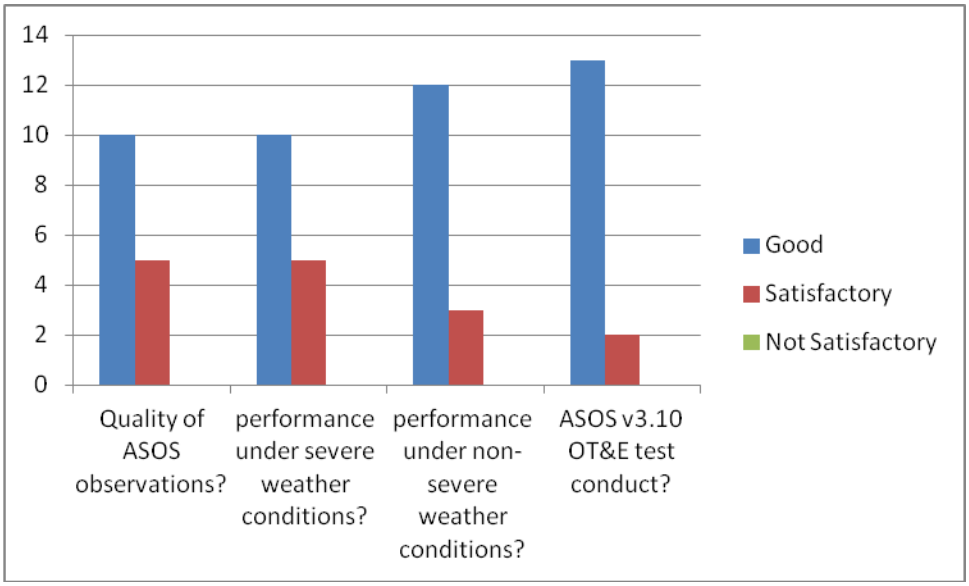
OPS24 solicited the OT&E participants (TECS, NWS regional focal points, etc) on a variety of questions about the quality of the V3.10 OT&E and the quality of the documentation accompanying the V3.10 OT&E. OPS24 received 15 responses to the survey via the on-line Survey Monkey website. The overwhelming majority of the responses were "yes", "good", or "satisfactory", and written comments from the users via survey monkey were very positive on the conduct and outcome of the OT&E. Thirteen questions and the 15 responses are summarized in the following three graphs below:

Graph 1: YES/NO Questions



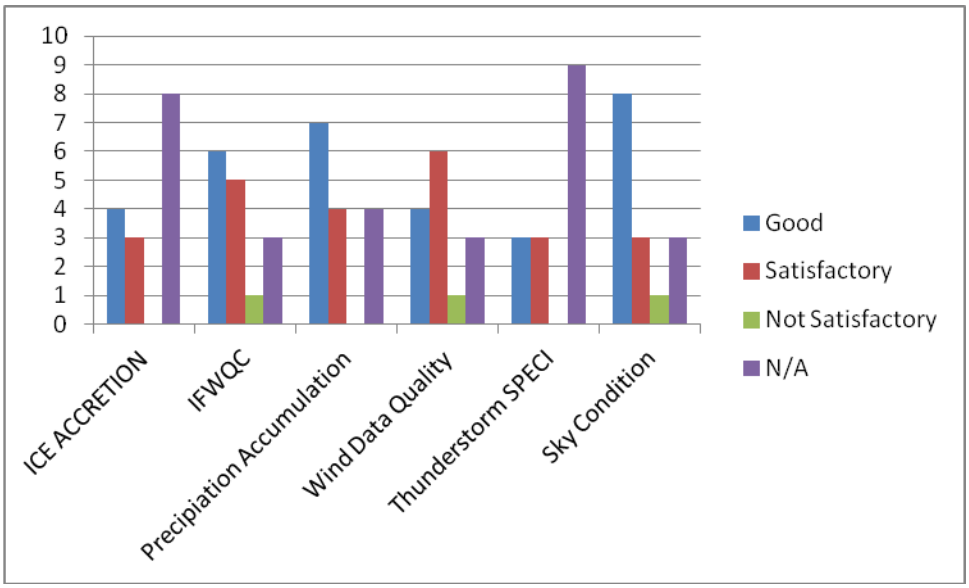
Graph 1: There were two "no" responses to the Yes/No Question: Suitable for National Deployment? From the Pacific Region, due to their ongoing issue with the ASOS-ADAS communications (related to the CODEX Modem settings). This will prevent V3.10 from being deployed in the Pacific Region until the Hawaii communication issue is solved. The two "no" responses to the 2nd question: "Mod Note 80G correct and available?" were written before the lastest version of Mod Note 80G was distributed. Mode Note 80G issues have been resolved. The two "no" responses to the question: "OT&E Plan Correct and Available?" involved initial access to the test plan, which was sent out through the regions and TRG, and OPS24 pointed the users to the correct link to the test plan via email and via the OPS24 website.

Graph 2: Performance Ratings



Graph 2: All responses were either "good" or "satisfactory

Graph 3: Algorithm Performance Chart



Graph 3: All responses were either "good" or "satisfactory". A summary of some of the written responses follows:

"I think the V3.10 OT&E process was well run and the meetings were productive."

"The installation of V3.10 was smoother than any other ASOS software load."

"Before the "final" modification note goes out to the field, have someone go over the "Note" to clear up typos and also to update the modification note. As we went through the different revisions, at times the note took you back to older outdated procedures and made it a bit cumbersome for the technician to successfully install the software load. Other than that, the entire OT&E plan pretty was pretty much delivered as advertised. Glad to have been a part of testing and evaluating the new load."

All typos in Mod Note 80G (early on in the OT&E) have been corrected, and since the OT&E had many iterations (3.05, 3.06, 3.061, 3.07, 3.08, 3.10) frequent small changes in the Mod Note were needed. Mode Note 80G has been updated to reflect all the changes needed.

"We need to move the conversations on the conference calls related to training shortfalls offline. If someone is having an issue installing because they don't have a working ASOS computer or don't know how to make it work then that is something they can address with their ESA or RMS, not on a conference call. I would have appreciated when that came up to have the office identify their region then direct them to the appropriate RMS. They shouldn't be waiting until the conference call to bring these items up. They should be seeking help at the local level. I don't think the conference call is meant for site specific troubleshooting. Also documentation needs to be complete and up to date. It would be nice for once to have the software ready to go before I am instructed that it is time to install instead of having to continually be forwarded emails from higher ups stating that it is time to install then finding out the software and supporting documentation aren't even available. Leadership should CHECK THE WEBSITE before telling the technicians to install. The documentation that accompanies the conference call should not just be read to us. If people are not getting the emails then that is a planning shortfall. If people are not opening the documents than that is negligence on their part and those of us who do our job thoroughly should not have to suffer so they can get up to speed. Having that documentation is important but it should be used as a guide and not just read from verbatim. Finally we need to do better with the flow of information. This bureaucracy is killing me. I am the one who is putting hands to ASOS and installing the software yet I am usually 3rd or 4th on the FWD chain if I

get the email at all. The people who are the most informed outside of OPS24 have the least to do with actually getting the job done."

OPS24 agrees that the TRG meetings sometimes lasted longer than desired, and that at times, issues raised needed to be continued off-line, but every effort was made to let the users express their concern (that is part of the TRG meeting agenda) when they had an issue. The documentation was up to date and complete, and made available several ways to users, via email through the TRG, via NWS Regional Focal Points, and via the OPS24 website.

OPS24 wishes to thank everyone who reposnded to the survey, and for all sites participation in a successful V3.10 OT&E.

4.0 Conclusions and Recommendations

V3.10 contains many new capabilities including several new or enhanced meteorological algorithms and other enhancements to the ASOS software that are not available in V2.79Y. V3.10 also fixes many OTR's that have been written against earlier ASOS software loads. It is strongly recommended that users of ASOS (technicians/managers/observers/air traffic controllers) read the extensive documentation/training materials associated with OT&E which are available from the link in section 3.1. In addition, the FAA Training documentation for V3.10 software is available on the Miscellaneous Documents pull down menu from the link referenced in section 3.1 and selecting the file name
Laminated_Quick_Ref_Card_for_ASOS_Software_Ver_3.10

V3.10 OT&E has successfully demonstrated that all of the new capabilities, enhancements, and OTR fixes that apply to OT&E sites are functioning properly or as designed. There were no impact 1 or 2 TTR's left open after V3.10 OT&E. Voting Results for National Deployment of V3.10 are provided below:

TRG Members

Name/Organization	Function	Vote	3.10 National Deployment?
Joseph Fiore (W/OPS24)	Test Review Group Chair	√**	
Joseph Fiore (W/OPS24)	Test Director	√	**Y**
Greg Dalyai (W/OPS12)	Maintenance Branch	-	
Bing Huang (ATO-T)	FAA Focal Point	√	**Y**
Tim Rutkoswki (W/ER41)	Eastern Region ASOS Focal Point	√	**Y**
Lewis Harrington (W/SR41)	Southern Region ASOS Focal Point	√	**Y**
Brian Hirsch(W/CR1)	Central Region ASOS Focal Point	√	**Y***
Adam Mathis (W/WR1)	Western Region ASOS Focal Point	√	**Y**
James Durr (W/AR4)	Alaska Region ASOS Focal Point	√	**Y**
John Bush (W/PR1)	Pacific Region ASOS Focal Point	√	**N***
Dan Sobien (WFO TBW) (Mark Russo)	NWS Employee Organization Focal Point	√	**Y**

Christopher Stark (W/OPS32)	AOMC	-	
Ken Davidson (W/OPS)	ISSO (ASOS)	√	**Y**
Gerald “Wayne” Knight (SPAWARSYSCEN)	Navy Focal Point	√	**Y**
Blake Lasher (NCDC)	NCDC Focal Point	√	**Y**

*** The Test Review Group Chair is not a voting member of the TRG unless there is a tie. The TRG Chair casts the deciding vote in the event of a tie.*

* - The Pacific Region is waiting for a resolution to the CODEX Modem Communication issue between ASOS and ADAS before they can deploy v3.10.

ATRB Members

Name/Organization	Function	Vote	3.10 National Deployment?
Bert Viloria (W/OPS24)	ATRB Chair/Primary	-	
Joseph Fiore (W/OPS24)	DOC/NWS Secretariat/Alternate Chair/Primary	-	
Richard Parry (W/OPS22)	DOC Primary	√	Y
Brian Hirsch (W/CR1)	DOC Alternate	(√)	
Bing Huang (FAA- ATO-T)	FAA Primary	√	Y
Tuyen Kieu (FAA–ATO-W)	FAA Alternate	(√)	
Capt. Hornsby (USAF Offutt AFB)	USAF Primary	√	Y
Philip Haines (USAF Offutt AFB) Capt. Hornsby	USAF Alternate	(√)	
Gerald “Wayne” Knight (SPAWARSYSCEN)	US Navy Primary	√	Y
Ronald Heatherdale (SPAWARSYSCEN)	US Navy Alternate	(√)	Y
Roy Rasmussen (NCAR)	NCAR Primary	√	
Scott Landolt (NCAR)	NCAR Alternate	(√)	Y

Appendix A – Test Review Group Members - ASOS Test Review Board Members - V3.10 OT&E Site List

TRG Members

Name/Organization	Function	Vote
Joseph Fiore (W/OPS24)	Test Review Group Chair	√**
Joseph Fiore (W/OPS24)	Test Director	√
Greg Dalyai (W/OPS12)	Maintenance Branch	-
Bing Huang (ATO-T)	FAA Focal Point	√
Tim Rutkoswki (W/ER41)	Eastern Region ASOS Focal Point	√
Lewis Harrington (W/SR41)	Southern Region ASOS Focal Point	√
Brian Hirsch(W/CR1)	Central Region ASOS Focal Point	√
Adam Mathis (W/WR1)	Western Region ASOS Focal Point	√
James Durr (W/AR4)	Alaska Region ASOS Focal Point	√
John Bush (W/PR1)	Pacific Region ASOS Focal Point	√
Dan Sobien (WFO TBW)	NWS Employee Organization Focal Point	√
Christopher Stark (W/OPS32)	AOMC	-
Ken Davidson (W/OPS13)	ISSO (ASOS)	√
Gerald “Wayne” Knight (SPAWARSYSCEN)	Navy Focal Point	√
Blake Lasher (NCDC)	NCDC Focal Point	√

ATRB Members

Name/Organization	Function	Vote	V3.10 National Deployment?
Bert Viloria (W/OPS24)	ATRB Chair/Primary	-	
Joseph Fiore (W/OPS24)	DOC/NWS Secretariat/Alternate Chair/Primary	-	
Richard Parry (W/OPS22)	DOC Primary	√	Y
Brian Hirsch (W/CR1)	DOC Alternate	(√)	
Bing Huang (FAA- ATO-T)	FAA Primary	√	Y
Tuyen Kieu (FAA–ATO-W)	FAA Alternate	(√)	
Robert “Chuck” Beebe (USAF Offutt AFB)	USAF Primary	√	Y
Philip Haines (USAF Offutt AFB) Capt. Hornsby	USAF Alternate	(√)	
Gerald “Wayne” Knight (SPAWARSYSCEN)	US Navy Primary	√	Y
Ronald Heatherdale (SPAWARSYSCEN)	US Navy Alternate	(√)	Y
Roy Rasmussen (NCAR)	NCAR Primary	√	
Scott Landolt (NCAR)	NCAR Alternate	(√)	Y

V3.10 OT&E SITES					
Number	ASOS Site ID	ASOS SITE Name	Agency	NWS Region	ASOS Type
1	HIO	Portland, OR	FAA	W	1 DCP
2	GKN	Gulkana, AK	FAA	A	1 DCP
3	JNU	Juneau, AK	FAA	A	1 DCP
4	KNGU	Norfolk, NAS, VA	Navy	E	1 DCP
5	KNKT	Cherry Point, MCAS, NC	Navy	E	1 DCP
6	KNBC	Beaufort, SC	Navy	E	1 DCP
7	KNIP	Jacksonville NAS, FL	Navy	S	1 DCP
8	FAI	Fairbanks, AK	NWS	A	2 DCP
9	DSM	Des Moines, IA	NWS	C	1 DCP
10	GRB	Green Bay, WI	NWS	C	1 DCP
11	PIA	Peoria, IL	NWS	C	1 DCP
12	SGF	Springfield, MO	NWS	C	1 DCP
13	TOP	Topeka, KS	NWS	C	1 DCP
14	BIS	Bismarck, ND	NWS	C	1 DCP
15	COU	Columbia, MO	NWS	C	1 DCP
16	ACY	Atlantic City, NJ	NWS	E	1 DCP
17	CLE	Cleveland, OH	NWS	E	2 DCP
18	ORH	Worcester, MA	NWS	E	1 DCP
19	PWM	Portland, ME	NWS	E	2 DCP
20	ITO	Hilo, HI	NWS	P	1 DCP
21	LIH	Lihue, HI	NWS	P	1 DCP
22	TRI	Bristol, TN	NWS	S	1 DCP
23	DFW	Dallas-Fort Worth, TX	NWS	S	2 DCP
24	TUL	Tulsa, OK	NWS	S	1 DCP
25	PDT	Pendleton, OR	NWS	W	1 DCP
26	PHX	Phoenix, AZ	NWS	W	1 DCP
27	TUS	Tucson, AZ	NWS	W	1 DCP
28	OLM	Olympia, WA	NWS	W	1 DCP
29	BIL	Billings, MT	NWS	W	1 DCP
30	SIT	Sitka, AK	FAA	A	1 DCP
31	SPG	St. Petersburg, FL	FAA	S	1 DCP
32	BFD	Bradford, PA	FAA	E	1 DCP
33	RME	Rome, NY	FAA	E	1 DCP
34	TAN	Taunton, MA	FAA	E	1 DCP
35	WAL	Wallops, Island, VA	NWS	E	1 DCP
36	KNAK	Annapolis, MD	NAVY	E	1 DCP
37	DMH	Baltimore, MD	NWS	E	SCA
38	NYC	Central Park, NY	NWS	E	SCA
39	1V4	St. Johnsbury, VT	NWS	E	SCA
40	POR	Portage, AK	FAA	A	1 DCP
41	GIF	Winter Haven, FL	NWS	S	1 DCP
42	ATT	Austin, TX	NWS	S	1 DCP
43	GDP	Guadalupe Pass, TX	NWS	S	1 DCP
44	ANJ	Sault Ste. Marie, MI	NWS	C	SCA
45	CDJ	Chillicothe, MO	NWS	C	SCA
46	P28	Medicine Lodge, KS	NWS	C	SCA
47	LOL	Lovelock, NV	NWS	W	1 DCP
48	P68	Eureka, NV	FAA	W	1 DCP
49	OLS	Nogales, AZ	FAA	W	1 DCP
50	OVE	Oroville, CA	FAA	W	1 DCP
51	CLM	Port Angeles, WA	FAA	W	1 DCP
52	BMQ	Burnet, TX	FAA	S	1 DCP
53	UZA	Rock Hill, SC	FAA	E	1 DCP
54	IGX	Chapel Hill, NC	FAA	E	1 DCP
55	DEQ	DeQueen, AR	FAA	S	1 DCP
56	LEX	Lexington, KY	FAA	C	1 DCP
57	OVS	Boscovel, WI	FAA	C	1 DCP